

REMARKS

The present invention relates to a two loop heat conversion system for high heat density planar devices in which high density heat in an area adjacent to a surface is transferred into a liquid cooling medium closed loop in a radiated heat to liquid heat transfer component positioned in contact with the surface that is connected, to a liquid to gas medium, heat exchanger in a first loop and a gas medium second loop is arranged to carry away all radiated heat from the assembly and all heat extracted from the liquid in the liquid to gas heat exchanger and exhaust it to the ambient.

The Examiner is requested to reconsider the rejection of the claims as being anticipated by the references cited. Applicants will respond to the references to Messina, et al. (U.S. Patent 5,239,200) and Papst, et al. (U.S. Patent 4,513,812 as representative of the non-applicability of the other references cited.

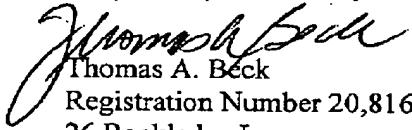
Messina describes a way to change the cooling channel density described therein to address the local cooling requirement as shown in Figure 5 of the reference. The channel arrangement is totally different from what Applicants disclose and claim in the instant application. In Messina's arrangement, the coolant is moving up and down perpendicular to the plane of chips underneath. In Applicants' arrangement the coolant is moving in and out parallel to the plane of the chips. Applicants' system is more efficient because all of the coolant sees the heat sources at essentially the same distance.

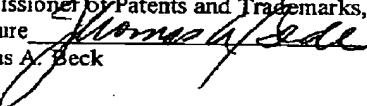
Papst et al. describe a heat sink that has a motor attached to it by which to drive air flowing through the heat sink fins. Although the disclosure by Papst to have a coolant pump embedded in a cooling device is similar to Applicants, the implementation as well as the cooling channel structure and pump are different. In the instant application, the concept of putting air and liquid cooling together in the form factor as shown in Figure 4 is unique. The way to construct a liquid

cold plate using two mated structure on two pieces flat pieces to form narrow serpentine channels parallel to the plate where heat is introduced is also different from the prior art.

The Examiner is requested to allow this case as a result of the amendments to and cancellations of the claims.

Respectfully Submitted,


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